

Claims

1. A holding means for holding articles having upward and downward facing surfaces onto a conveyor for transporting the articles thereon comprises;
 - 5 a base suitable for the downward facing surface to sit upon;
 - a grip part positioned relatively upwardly of the base and suitable to bear on the upward facing surface;
 - the base and/or grip part being moveable so that the article may be positioned between the base and the grip part, and the base and grip part may then
- 10 be brought closer together to grip the article between them, and subsequently moved further apart to release the article.
2. A holding means according to claim 1 which comprises;
 - 15 a base having an upper part able to mate against a downward facing surface of an article,
 - and a grip part having a grip means able to mate against an upward facing surface of the article, the grip part being moveable relative to the base between upper and lower positions of the grip part, such that when the grip part is in its upper position there is a gap between the grip means and the upper part of the base
- 20 into which gap at least part of the article may be placed, and when the grip part is in the lower position the grip means bears on the article and the downward facing surface of the article mates with the upper part of the base so that the article is held between the grip means and the base.
- 25 3. A holding means according to claim 1 or 2 adapted and suitable for gripping a pharmaceutical vial.
4. A holding means according to claim 3 adapted and suitable for gripping a vial carried in a carrier, the holding means being arranged to grip the vial carrier.

5. A holding means according to claim 2, 3 or 4 wherein the grip part comprises an up-down extending shaft having a grip means adjacent the upper end of the shaft.

5 6. A holding means according to claim 5 wherein the grip means comprises a grip arm connected with the shaft and extending in a direction transverse to the shaft up-down direction, the grip arm being able to bear upon the article.

10 7. A holding means according to claim 6 wherein the grip means comprises two grip arms, between which the article may fit, with both arms extending in the transverse direction.

15 8. A holding means according to claim 6 or 7 wherein the grip part also comprises a support for the article which can fit underneath the article and support it whilst the grip part is in its upper position.

20 9. A holding means according to claim 8 wherein the support comprises one or more support arm that extends transverse to the up-down direction of the shaft to a remote end of the support arm.

10. A holding means according to any one of claims 2 to 9 wherein the base includes a guide to support and guide the grip part in its upward and downward movement between upper and lower positions.

25 11. A holding means according to any one of the preceding claims wherein the grip part is biased toward its lower position.

30 12. A holding means according to any one of claims 8 to 11 wherein the base has a receiving cavity for the support, and into which the support may be received when the grip part is in its lower position.

13. A holding means according to claim 12 wherein the up-down depth dimension of the receiving cavity is greater than the up-down thickness dimension of the support so that when the support is received in the receiving cavity with the grip part in its lower position the upper surface of the support is below the upper surface
5 of the upper part of the base.

14. A conveyor system for the transport of articles in a conveying direction, provided with one or more holding means as claimed in any one of claims 1 - 13.

10 15. A conveyor system according to claim 14 incorporating a loader means adjacent to the conveyor and arranged to carry an article into a position relative to the holding means when the grip means is in its upper position, such that the downward facing surface of the article is above the upper part of the base and the upward facing surface of the article is below the grip means.
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16. A conveyor system according to claim 14 or 15 incorporating an unloader means adjacent to the conveyor and arranged to unload articles from the holding means, being configured to receive an article gripped by the holding means, prior to movement of the grip part into its upward position to release the article from the
20 holding means.

17. A conveyor system according to claim 14, 15 or 16 provided with one or more processing station arranged adjacent to the conveyor to perform one or more operation on articles carried by the conveyor.
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18. A conveyor system according to claim 17 wherein a processing station is configured to perform a vial-filling process in which a vial with a closure made of a heat- fusible puncturable material is conveyed by the conveyor to a position adjacent the processing station, and the processing station punctures the vial closure by
30 passing a hollow filling needle through the closure, introduces a material into the vial via the needle, and withdraws the needle.

19. A conveyor system according to claim 17 or 18 wherein a processing station is configured to perform a process in which a puncture hole in a vial closure made of a heat- fusible puncturable material is sealed using a source of heat.

5 20. A conveyor system for the transport of vials with their closure made of a heat- fusible puncturable material in a conveying direction, provided with one or more holding means as claimed in claim 1 further provided with one or more processing station at which is situated a means for passing a hollow filling needle through the closure, introducing a material into the vial via the needle, and

10 withdrawing the needle.

21. A conveyor system according to claim 20 additionally comprising a processing station at which is situated a means for sealing the residual puncture left by the needle using a source of heat.

15 22. A conveyor system provided with a processing station to perform a process in which a vial with its closure made of a heat- fusible puncturable material is punctured by passing a hollow filling needle through the closure, a material introduced into the vial via the needle and the needle then withdrawn, provided with means to resist the upward force of withdrawing the filling needle.

20 23. A process in which a vial with a closure made of a heat- fusible puncturable material is conveyed to a position adjacent a processing station which punctures the vial closure by passing a hollow filling needle through the closure, introduces a material into the vial via the needle, and withdraws the needle, or adjacent a processing station which performs a process in which a puncture hole in a vial closure made of a heat- fusible puncturable material is sealed using a source of heat, wherein the vial is conveyed adjacent the processing station using a conveyor system as claimed in any one of claims 14-22.

25 30 24. A processing station for performing an operation on an article in a laminar upstream to downstream direction flow of purified air which comprises;

a processing apparatus for performing the operation upon the article,
an aerodynamic shroud around at least part of the apparatus and positioned
such that a leading surface of the aerodynamic shroud is upstream of the apparatus.

5 25. A processing station according to claim 24 wherein the processing station is
configured to perform a vial-filling process in which a vial with a closure made of a
heat- fusible puncturable material is conveyed to a position adjacent the processing
station, and the processing station punctures the vial closure by passing a hollow
filling needle through the closure, introduces a material into the vial via the needle,
10 and withdraws the needle.

26. A processing station according to claim 24 or 25 wherein the processing
station is configured to perform a process in which a puncture hole in a vial closure
made of a heat- fusible puncturable material is sealed using a source of heat
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27. A processing station according to claim 24, 25 or 26 mounted adjacent a
conveyor system which is downstream of the processing station relative to the
airflow and adapted to transport articles to a position adjacent the processing station.

20 28. A processing station according to claim 27 wherein the conveyor system is as
claimed in any one of claims 14 to 22.

25 29. A processing station according to any one of claims 24 to 28 wherein the
shroud comprises two part-shrouds, elongated in a direction perpendicular to the
direction of the laminar flow and to the plane of the cross section, hinged together at
their respective leading edges to rotate about a hinge axis parallel to the elongate
direction.

30 30. A process comprising puncturing a closure of a vial made of a heat- fusible
puncturable material by passing a hollow filling needle through the closure,
introducing a material preferably a medicament into the vial via the needle, then

withdrawing the needle, wherein the needle comprises part of a processing station as claimed in any one of claims 24 to 29.

31. A process comprising sealing a puncture hole in a thermoplastic closure of a
5 vial using a source of heat, wherein the source of heat comprises part of a
processing station as claimed in any one of claims 24 to 29.